6

B.Sc. In BTM, 2nd Semester **Date:** 20 February, 2022 (Morning)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

Mid-Semester Examination — Summer Semester, A. Y. 2021-2022
Course No.: EEE 4261 — Time: 90 Minutes
Course Title **Electrical and Electronic Technology II** — Full Marks: 75

There are **3 (three)** questions. Answer all **3 (three)** questions. The symbols have their usual meanings. Programmable calculators are not allowed. Marks of each question and corresponding COs and POs are written in the brackets. **If there is any error in the question, take suitable assumptions.**

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1. a) Sketch **I** vs **V** graph for **fig: 1a** and **fig: 1b.** **12** **CO2 PO2**

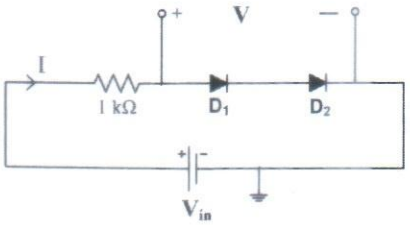

fig: 1a

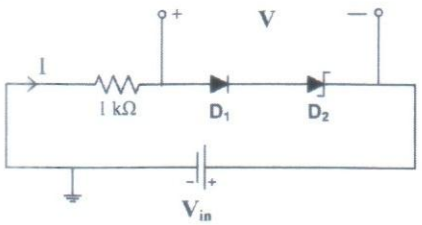

fig: 1b

Here, Breakdown Voltage $V_B = -30V$
Zener Voltage, $V_Z = -5V$
For forward bias of diode, use constant voltage model with $V_f = 0.7V$
V_{in} is varied from -50V to 50V.

b) Sketch output graph V_{out} for **fig: 2d** for the voltage profiles in **fig: 2a,2b and 2c.** **13**
Consider ideal voltage diode model for all diodes. **CO2 PO2**

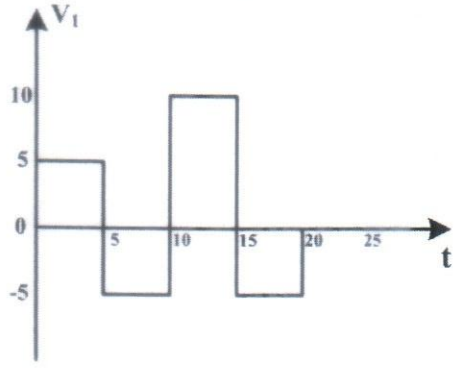

fig: 2a

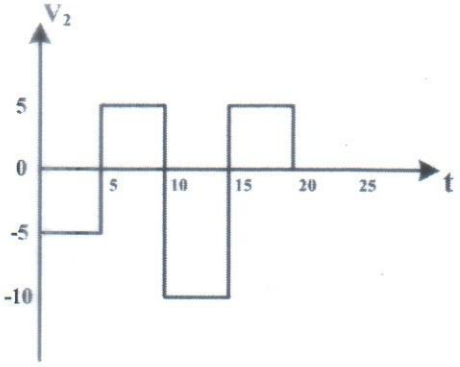

fig: 2b

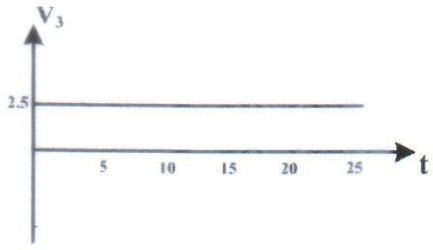

fig: 2c

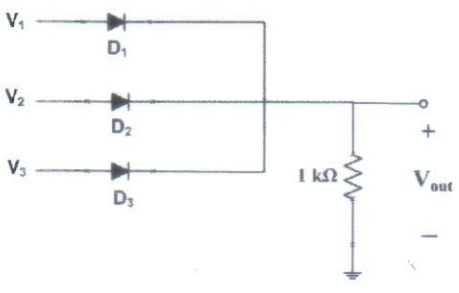

fig: 2d

2.

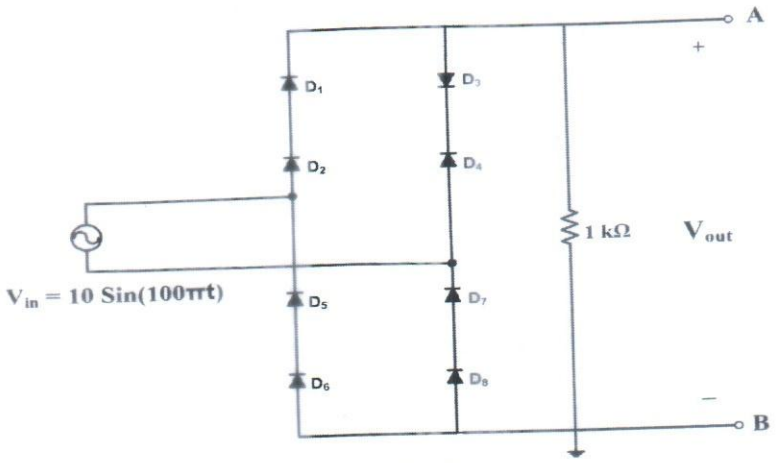

fig: 3

In **fig:3**, Breakdown Voltage V_B = -30V

For forward bias of diode, use constant voltage model with $V_f = 0.7V$

a) Sketch V_{out}. **5 CO2 PO2**

b) Sketch V_{out} when 200 μF capacitor is connected between node A and B. **10 CO2 PO2**

c) Sketch V_{out} if D_3 is replaced with a zener diode of V_Z = -5V. The anode and cathode of zener diode will be connected to the nodes same as the anode and cathode of D_3. **10 CO2 PO2**

3. a) Analyze the circuit in **fig.4** to determine the voltages at all nodes and the currents in all branches. Assume β = 100. **15 CO2 PO2**

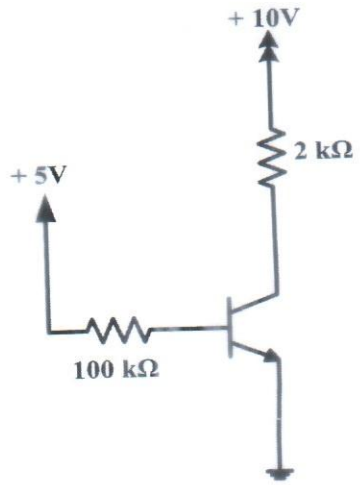

fig: 4

b) Describe different operating modes of BJT along with proper circuit configurations. **10 CO1 PO1**